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New Brunswick Plantation Pest Assessment Survey Report for 1991

Plantations have become a way of life in forestry as a means to ensure future wood supply and production. Their growth and well-being is of utmost importance. Monitoring the forest pest situation in plantations is an essential step in their management and protection if they are to reach their potential. Injury resulting from insects or diseases adversely affects tree growth and development. Early detection of pest problems through regular plantation pest assessment and implementation of appropriate control measures will help to prevent the build up of disease or insect populations thereby reducing the threat to the crop's commercial value.

This year (1991)marks the fifth year that plantation pest assessment surveys have been carried out in New Brunswick. The cooperative effort by many agencies in the forest sector and ourselves continues. The survey objectives remain the same: to monitor forest insect and disease conditions, to assess the levels of damage, to summarize and analyze the information to identify plantations requiring immediate attention, and to report the findings. Participating cooperators assess the plantations for pest conditions and the Forest Insect and Disease Survey unit of Forestry Canada provides training, coordination, identification services, and data analysis. In 1991, the cooperating organizations in New Brunswick included:

- J.D. Irving Ltd.
- Stone-Consolidated Inc.
- New Brunswick Dept. of Natural Resources and Energy

Forestry Canada - Maritimes Region

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The assessments involved detailed examination of fifty trees in each of the selected plantations. Ten sub-plots of five trees were selected along a pre-determined line of travel through the plantation. The distance between sub-plots varied with plantation size to ensure an adequate representation of conditions. When field identification of pest problems was not possible, samples were collected and forwarded for identification at Forestry Canada.

Individual plantation pest assessment reports with pest identifications are prepared for cooperators and returned to them as quickly as possible to aid pest managers in decision making.

The purpose of this report is to provide pest managers with an overview of pest condition information from all plantations assessed in New Brunswick in 1991. The information presented in the tables and figures that follow is the result of summary and analysis of data collected from 163 plantations. Of these, 109 were spruce, 36 were pine, and 11 were of other species (Table 1). Other species included three larch, five mixed species, two mixed hardwoods, and one cedar. In addition, there were seven silviculturally treated (thinned) areas assessed and these included: four balsam fir, three black spruce, and one unspecified spruce.

A total of 8,150 trees were assessed this year. Analysis of overall tree condition shows that, on average, 94.8% of the trees were assessed as being healthy (Table 2). Figure 1 illustrates that over 50% of the plantations assessed have at least some incidence of moderate or severe injury. The exception to this are the plantations in the "other" category. See Table 4 for a list of the pests responsible for injuries.

Table 1. . Number of plantation assessments by tree species and organization conducting field work in the various resource management regions in New Brunswick in 1991.

Region	Tree Species	Total plantations assessed	Organization			
			DNR	JDI	SCI	FIDS
1	Jack pine	3	2	-	1	-
	Red pine	1	-	-	1	-
	Black spruce	10	3	1	6	-
	White spruce	1	-	1	-	-
	Mixed	3	2	-	1	-
	Thinned	1	1	-	-	-
	Cedar	1	-	-	1	-
	Total for Region	**20**				
2	Jack pine	3	2	-	-	1
	Black spruce	6	4	1	-	1
	Mixed	1	1	-	-	-
	Larch	2	2	-	-	-
	Thinned	1	1	-	-	-
	Total for Region	**13**				
3	Jack pine	8	8	-	-	-
	Black spruce	3	3	-	-	-
	Red spruce	1	1	-	-	-
	White spruce	1	1	-	-	-
	Larch	1	1	-	-	-
	Thinned	2	2	-	-	-
	Total for Region	**16**				
4	Jack pine	14	7	5	-	2
	Red pine	5	2	1	-	2
	Black spruce	15	13	2	-	-
	White spruce	3	2	1	-	-
	Mixed	1	1	-	-	-
	Hardwood	2	2	-	-	-
	Thinned	3	2	-	-	1
	Total for Region	**43**				
5	Jack pine	2	-	2	-	-
	Black spruce	31	5	26	-	-
	White spruce	30	2	28	-	-
	Norway spruce	8	-	8	-	-
	Total for Region	**71**				
	Total for New Brunswick	**163**	**70**	**76**	**10**	**7**

Table 2. Condition of trees in plantations and thinned areas in New Brunswick in 1991.

Species	Tree Condition			
	Healthy	Fair	Poor	Dead
Spruce	95.3	2.9	0.8	1.0
Pine	93.6	2.6	1.5	2.3
Thinned	98.6	0.6	0.9	0.0
Other	93.9	2.9	1.3	1.9
Average	94.8	2.8	1.1	1.3

Discussion

Shoestring root rot was reported in 17% of the spruce and pine plantations surveyed this year (Table 4). When this disease was observed anywhere in the plantation, it was recorded whether or not it was on the trees being assessed. For this reason, the high incidence is not reflected in the root section of Table 3. Root rot is a serious problem in young plantations because of the effect that it has on tree health. Like most root diseases, it affects whole-tree health by restricting water and nutrient uptake and subsequent transport up the stem, thereby slowing or arresting tree growth. *Armillaria mellea*, the fungus that causes shoestring root rot, persists in the soil, living on slash or litter, in the absence of living trees. Where young trees are present (less than 5 m), the disease may infect through damaged roots or be transmitted through root grafts with infected trees.

There was a high incidence of aphids this year, probably due to a very warm, dry, early summer that favored their development. They were reported on all of the host species, but caused moderate or severe damage only on spruce and trees in thinned areas (Table 4).

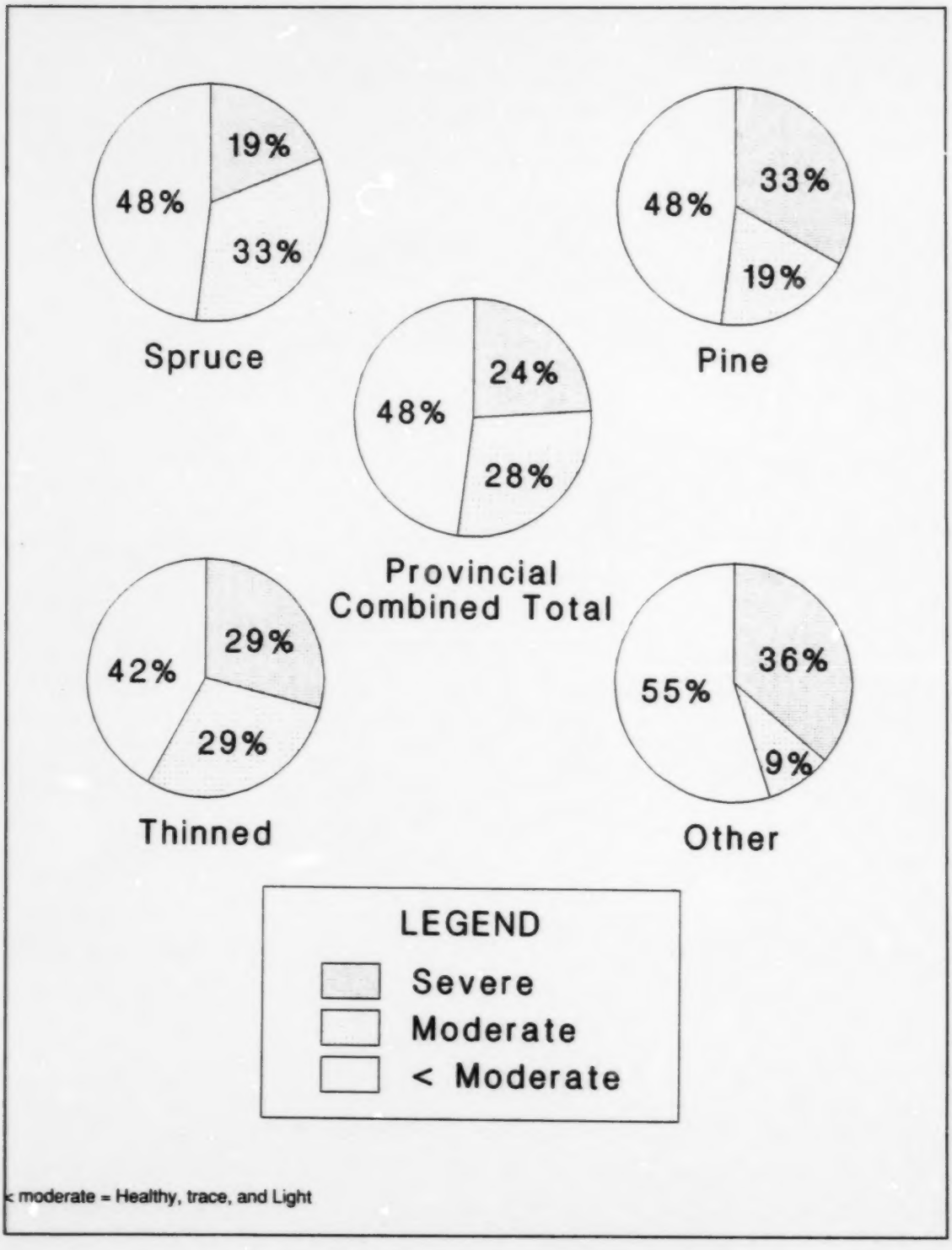
Animal damage occurred in 33% of the pine plantations assessed and was attributed mostly to porcupines, hare, and deer. Spruce plantations suffered comparatively less damage than the pines (Table 4).

Northern pitch twig moth was reported in over half (53%) of the pine plantations assessed. While moderate or severe injury was reported in only 6% of the pine plantations (Table 4), this insect may be responsible for the branch damage listed in Table 3 where branch health falls below the provincial average.

Spruce bud midge was present in 42%, spruce bud moth in 31%, and frost in 62% of the spruce plantations, a combination of damage reflected in the low shoot health (80.9%) for spruce in Table 3.

Snow caused considerable damage this year in both pine and spruce plantations, but was significantly higher in the pine (50%) than in the spruce (24%) (Table 4).

Figure 1. Levels of injury expressed as a percentage of total number of plantations assessed by species in New Brunswick in 1991.



< moderate = Healthy, trace, and Light

Table 3. Condition of trees by tree part as assessed in plantations and thinned areas in the resource management regions of New Brunswick in 1991.

Tree Part	Species	Healthy	Trace	Light	Moderate	Severe
Needles	Spruce	95.3	3.4	1.0	0.2	0.1
	Pine	70.1	19.5	7.8	1.7	0.9
	Thinned	88.3	11.1	0.3	0.0	0.3
	Other	96.6	2.5	0.7	0.0	0.2
Buds	Spruce	91.5	6.6	1.4	0.3	0.2
	Pine	99.0	0.2	0.2	0.3	0.3
	Thinned	84.9	14.0	1.1	0.0	0.0
	Other	93.6	6.2	0.0	0.2	0.0
Shoots	Spruce	80.9	12.5	4.8	1.4	0.4
	Pine	95.8	3.7	0.4	0.1	0.1
	Thinned	85.7	3.4	6.3	4.3	0.3
	Other	96.1	3.0	0.7	0.2	0.0
Branches	Spruce	97.7	1.7	0.4	0.1	0.0
	Pine	88.7	8.5	2.4	0.0	0.3
	Thinned	89.1	9.7	0.6	0.3	0.3
	Other	88.8	1.6	3.2	4.3	2.1
Stems	Spruce	97.0	2.3	0.2	0.3	0.2
	Pine	96.1	2.2	0.6	0.6	0.6
	Thinned	99.4	0.0	0.0	0.3	0.3
	Other	99.1	0.2	0.0	0.7	0.0
		Healthy	**Damaged**	**Dead**		
Leaders	Spruce	91.0	9.0	0.0		
	Pine	97.0	3.0	0.0		
	Thinned	95.0	5.0	0.0		
	Other	98.0	2.0	0.0		
		Healthy	**Damaged**			
Roots	Spruce	99.0	1.0			
	Pine	99.0	1.0			
	Thinned	100.0	0.0			
	Other	99.0	1.0			

Table 4. Comparison of problems at trace and light levels of injury with those at moderate and severe levels as assessed in the plantation pest surveys in New Brunswick in 1991.

	Percentage of Plantations Affected							
	Pine Damage		Spruce Damage		Other Damage		Thinned Damage	
Problem	Trace & Light	Mod. & Sev.	Trace & Light	Mod. & Sev.	Trace & Light	Mod. & Sev.	Trace & Light	Mod. & Sev.
Insects								
Aphid	25	-	16	5	18	-	43	14
Bark beetles	3	3	2	1	9	-	14	-
Birch casebearer	-	-	-	-	18	-	-	-
Coneworm	6	3	4	2	-	-	-	-
Forest tent caterpillar	-	-	-	-	9	9	-	-
Gall adelgid	3	3	12	2	9	9	-	-
Hemlock looper	3	-	1	-	9	9	-	-
Jack pine budworm	6	-	-	-	-	-	-	-
Leafminer	-	-	-	-	18	-	-	-
Leaftier	-	-	-	-	-	-	-	-
Leafroller	8	-	6	-	-	-	-	-
Needle miner	3	-	1	-	-	-	-	-
Northern pitch twig moth	53	6	-	-	-	-	-	-
Pine cone beetle	8	-	-	-	-	-	-	-
Pine needle scale	8	-	-	-	-	-	-	-
Pine shoot borer	8	-	-	-	-	-	-	-
Pine tortoise scale	3	3	-	-	-	-	-	-
Pyralid moth	-	-	1	1	-	-	-	-
Root collar weevil	3	3	-	-	-	-	-	-
Sawfly	6	-	4	3	9	-	14	-
Spittlebug	3	-	1	-	-	-	-	-
Spruce bud midge	-	-	42	17	-	-	-	-
Spruce budmoth	-	-	31	13	-	-	-	-
Spruce budworm	-	-	14	2	18	-	-	-
White pine weevil	8	8	8	6	-	-	14	-
Diseases								
Beech bark disease	-	-	-	-	9	9	-	-
Globose gall rust	8	3	-	-	-	-	-	-
Needle cast	3	-	-	-	-	-	-	-
Needle rust	44	8	9	3	-	-	-	-
Scleroderris canker	6	6	-	-	-	-	-	-
Shoestring root rot	17	17	17	17	9	9	-	-
Witches broom	-	-	-	-	-	-	14	-
Other								
Animal	33	14	9	6	9	-	14	14
Competition: Hardwood	3	-	3	1	-	-	14	-
Softwood	-	-	1	1	-	-	-	-
Herbaceous	-	-	1	1	-	-	-	-
Unspecified	3	-	2	-	-	-	-	-
Drought	-	-	1	-	-	-	-	-
Frost	3	-	62	18	18	9	14	-
Mechanical damage	28	17	13	4	46	36	-	-
Microsite	-	-	9	6	-	-	14	-
Needle flecking	2	1	-	-	-	-	-	-
Planting	8	8	13	7	-	-	-	-
Snow damage	50	8	24	6	9	-	-	-
Wind damage	-	-	1	-	-	-	-	-
Winter damage	11	3	20	8	-	-	14	-

Calculations are based on the number of plantations assessed of each species: Pine = 36, Spruce = 109, Other = 11, and Thinned = 7.

Analysis of this year's data shows that over 90% of the trees assessed are healthy. However, moderate or severe injury was detected in over 50% of the plantations. Early detection of pests is one of the fundemental reasons for the plantation pest assessment surveys, as it provides information to pest managers while relatively few trees are affected and when control will be most effective and cost efficient.

R.A. Simpson

March 1992.